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EXAMINER	
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11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/670,054	LAKKIS, ISMAIL A.	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8 and 10-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,8,10,11,13-17,19-22 and 24* is/are rejected.

7)☒ Claim(s) *6,7,12,18 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 September 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-8, and 10-24 are pending in the instant application.

Response to Arguments/Amendments

2. In view of the amendments and arguments filed May 24, 2004, the following objections and rejections of the first office action are withdrawn.

The objection to the title is withdrawn, and the new title is accepted by the Examiner.

The objection to the abstract is withdrawn.

The objection to claim 14 as lacking antecedent basis is withdrawn.

3. Regarding the response to the claim rejections under 35 U.S.C. § 112 first and second paragraphs (pgs. 13-18), the rejections of claims 5, 6, 7, 8, and 23, under § 112 first paragraph are withdrawn, and the rejections of claims 6, 7, 12, 13, 15, 18, 20, and 23 under § 112 second paragraph are withdrawn.

4. The indicated allowability of claims 9 and 25 are withdrawn in view of the newly discovered reference(s) to Sugita (US 5757766). Rejections based on the newly cited reference(s) follow.

5. The prior art rejections under 35 U.S.C. § 103(a) made in the first office action are hereby withdrawn in view of the amendments to the claims. However, new art rejections are made below.

Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "70" in figure 12 has been used to designate both time domain data and frequency domain data. Corrected drawing sheets **and**

specification are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

7. Regarding the antecedent basis in the specification for claims 1 and 16, the claims include the limitation of performing a first time-frequency domain transformation on said unspread substreams at said transmitter prior to said spreading activity. The specification discloses the embodiment of the invention including a first time-frequency transformation in the transmitter according to figure 12 and page 21, paragraph 1. The first time-frequency domain transformation is embodied by reference 110 in figure 12, and the specification recites: "For the purposes of the present discussion, the **forth embodiment** of DSSS modulation section 44 **shall be deemed to omit section 110, while the fifth embodiment shall be deemed to include section 110.** Thus, **unspread substreams 70 convey time domain data** spreading section 72 **in the forth embodiment and frequency domain data** spreading section **in the fifth embodiment.**" However, because the reference to 70 in figure 12 is used both before and after optional IFFT block 110, it is unclear which unspread substream group 70 is being referred to as

time domain and frequency domain data(s) in the forth and fifth embodiments. Interpretations of the forth and fifth embodiments may therefore be made which are unconventional and improper according to the art.

Claim Objections

8. Regarding claims 1 and 16, both claims provide steps or means for a first and a second time-frequency domain transformation. However, the limitations are have been amended to the end of the claims. It is suggested by the Examiner that time-frequency domain transformation steps or means are appropriately placed in consecutive flow order for the clarity and readability of the claims and understanding of the invention as embodied by the claims.

9. The word "dispread" should be replaced by --despread—in claims 4, 6, and 17.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 3, 5, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita (US 5757766) in view of Cafarella et al (US 5809060 – previously cited; hereafter "Cafarella"), in further view of Scott (US 6388997 – previously cited), and in further view of Koppelaar et al (US 5416767; hereafter "Koppelaar").

Regarding claim 1, Sugita discloses a method of operating a spread-spectrum-based wireless communication system to efficiently utilize spectrum in the presence of multipath, (abstract) comprising: dividing a stream of data-conveying symbols into a plurality of unspread substreams at a transmitter (fig. 6, ref. 4); generating a common spreading code at said transmitter (fig. 6, ref. 21); spreading, at said transmitter, each of said unspread substreams using said common spreading code to form a plurality of spread substreams (col. 5, lines 9-25); combining, at said transmitter, said plurality of spread substreams to form a composite signal (fig. 6, ref. 22 and 23); wirelessly transmitting, from said transmitter, a communication signal formed from said composite signal (fig. 6, refs. 7 and 8); receiving said communication signal at a receiver (fig. 7); despreading said communication signal at said receiver to generate a baseband signal (col. 6, lines 19-36); performing a first time-frequency domain transformation on said unspread substreams at said transmitter *after* said spreading activity (fig. 6, ref. 25) and performing a second time-frequency domain transformation on said communication signal at said receiver prior to said despreading activity (fig. 7, ref. 32). Sugita does not disclose (a) that said spreading activity comprises temporally offsetting application of said common spreading code to said plurality of unspread substreams so that said spread substreams correspond to said unspread substreams modulated by cyclic variations of said common code, (b) using a mismatched filter to generate a baseband signal, or (c) performing a first time-frequency domain transformation on said unspread substreams at said transmitter *prior* to said spreading activity.

Regarding limitation (a) of claim 1, Cafarella does teach the benefits of using one temporally offset spread spectrum code to spread different data signals (col. 10, lines 3-5). Cafarella further teaches that the orthogonal codes created by the time shifted versions of a single spreading code have no projection on any other waveform in the set (col. 10, lines 44-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to use time shifted versions of a single spreading code as taught by Cafarella among the plurality of data signals disclosed by Sugita because the cyclic time shifted versions of the spreading code provide nearly orthogonal cross correlation properties that are advantageous for multiple user communication systems.

Regarding limitation (b) of claim 1, Scott teaches the advantages of the use of a mismatched filter (col. 47, lines 62-65). Because the mismatched filter reduces sidelobes in the filter response, it is more robust against incorrect symbol decisions. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the mismatched filter with the benefits of sidelobe suppression as taught by Scott in the communication system of Sugita because sidelobe suppression is a benefit of the mismatched filter leading to correct symbol decisions.

Regarding limitation (c) of claim 1, Koppelaar discloses an analogous communications system which divides a stream of data-conveying symbols into a plurality of unspread substreams at a transmitter, modulates each of said unspread substreams, and transmits (fig. 4). Koppelaar thereby teaches performing a first time-frequency domain transformation (fig. 4, ref. "IFFT") on substreams at a

transmitter *prior* to spreading or modulating activity (col. 4, lines 53-68). Hence, it is known in the art to implement a time-frequency domain transformation as shown by Koppelaar before spreading or modulating activity or after spreading activity as shown by Sugita, and the location of the transformation is considered a matter of design choice. It would have been obvious to one having ordinary skill in the art at the time which the invention was made to implement the time-domain transformation before spreading as exemplified by Koppelaar in the system of Sugita because it is a well known alternative in the art.

Regarding claim 3, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. Further, Sugita discloses said dividing activity produces successive blocks of symbols, where each block includes symbols currently present in each unspread substream, and each block has a block period. Each group of symbol outputs from the serial to parallel converter (fig. 6, ref. 4) comprises a block including symbols present in each unspread substream. Further, Koppelaar discloses temporally offsetting and combining activities being mutually configured so that for a portion of each block period said composite signal is responsive to symbols from two different blocks (col. 1, lines 5-18, lines 50-64). Koppelaar teaches that intersymbol interference is introduced by delays among the blocks of data to be combined (fig. 4, ref. "DELAY") to thereby make the transmission signal less vulnerable to impediments of the transmission channel (col. 1, lines 60-64). Thereby, the composite signal is responsive to symbols from two different blocks.

Regarding claim 5, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. Further, Sugita discloses that said dividing activity produces successive blocks of symbols, where each block includes symbols concurrently present in each unspread substream; and said temporally offsetting and combining activities are mutually configured so that said composite signal is responsive to symbols only from common blocks. Each group of symbol outputs from the serial to parallel converter (fig. 6, ref. 4) comprises a block including symbols present in each unspread substream. Further, because no delay is inserted between the dividing activity and the combining activity, said composite signal is responsive to symbols only from common blocks.

Regarding claim 11, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. Further, Cafarella discloses the use of cyclic variations of the common code and cyclic variations are also defined by a matrix in cyclic Toeplitz form. Because a cyclic Toeplitz matrix contains the cyclic variations of the same rows or common codes, it is obvious to apply the common codes as a cyclic Toeplitz form.

Regarding claim 13, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. Further, it is inherent that spreading code exhibits a flat response. The term spreading code refers to code that exhibits a flat spectral response and is used to spread the spectral response of data having a frequency spectrum peak. The spreading section refers to common code that is a spreading code. Hence, the

spreading section is configured so that the spectral analysis of the common code exhibits a flat response.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Scott, in further view of Koppelaar, and in further view of O'Shea et al (US 6563856 – previously cited; hereafter "O'Shea").

Regarding claim 4, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 3 as applied above. They do not disclose that said mismatched filter used in said dispreading activity corresponds to a matched filter combined with a sidelobe suppression filter. However, O'Shea teaches the use of a matched filter and a sidelobe suppressor in a receiver (fig. 5B; col. 4, lines 43-45). The benefit of the sidelobe suppressor is well known in the art because it helps to avoid incorrect signal decisions. Therefore, it would have been obvious to one of ordinary skill in the art at the time which the invention was made to utilize the sidelobe suppressor as taught by O'Shea in the wireless communication system of Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar because the sidelobe suppressor results in more robust symbol determination by suppressing undesirable sidelobes.

13. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Scott, in further view of Koppelaar, and in further view of Schilling et al (US 6078576 – previously cited; hereafter "Schilling").

Regarding claim 14, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. They

do not disclose a TDMA spread spectrum based communications system having a first and a second receiver. However, Schilling teaches a method of operating a spread-spectrum-based communication system (fig. 1) wherein the receiver is a first receiver (fig. 1, ref. 31), the filter is a first filter (inherent in the first receiver), the baseband signal is a first baseband signal, and the method additionally comprises receiving the communication signal at a second receiver (fig. 1, ref. 32), despreading the communication signal in the second receiver using a second filter to generate a second baseband signal (col. 3, lines 24-29), generating a data stream as a time division multiple access (TDMA) stream having a plurality of time slots wherein a first one of the plurality of time slots is assigned to the first receiver and a second one of the plurality of time slots is assigned to the second receiver (col. 3, lines 37-41), evaluating the first baseband signal at the first receiver to detect the first one of the time slots, and evaluating the second baseband signal at the second receiver to detect the second one of the time slots (col. 3, lines 45-50). Figure 1 of Schilling shows a single transmitter and a plurality of receivers (refs. 31-35) each having a filters and generating a baseband signal. Each receiver evaluates a particular time slot as disclosed by Schilling because the signals between the receivers and transmitters are orthogonal in time (col. 3, 37-42) meaning that a single receiver will evaluate and transmit on a single time slot. Schilling thereby discloses a TDMA system which is well known in the art, and discloses that the advantages are reduction in multipath and the near-far problem (col. 2, lines 30-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a TDMA system as taught by Schilling in the

communications system of Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar.

Regarding claim 15, Sugita in view of Cafarella, in further view of Scott, in further view of Koppelaar, and in further view of Schilling disclose the limitations of claim 14 as applied above. Further, Schilling discloses a method of operating a spread-spectrum-based communication system wherein the transmitter is a first transmitter (fig. 1, ref. 30) and the communication signal is a first communication signal the first transmitter being configured so that the first communication signal occupies a spectrum and the first communication signal is detectable throughout a first radio coverage area, and additionally comprises transmitting a second communication signal from a second transmitter (col. 3, lines 24-28), the second communication signal occupying spectrum and being detectable throughout a second radio coverage area which is adjacent to the first radio coverage area. It is understood that a transmitter transmits a first communication signal that is detectable throughout a first coverage area, and a second transmitter transmits a second communication signal that is detectable throughout a second coverage area.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Scott, in further view of Koppelaar, and in further view of Baier et al ("Performance of M-algorithm MLSE equalizers in frequency-selective fading mobile radio channels"; hereafter "Baier et al").

Regarding claim 8, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 5 as applied above. They do not disclose the use of a MLSE equalizer in the receiver. However, Baier

teaches the advantages of MLSE equalizers in receivers for mitigating frequency selective fading (abstract). One skilled in the art is well aware of the advantages gained by the use of MLSE equalizers in receivers. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize an MLSE equalizer as taught by Baier in the communications system of Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar because it can be advantageously used to improve performance in frequency selective fading channels.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Scott, in further view of Koppelaar, and in further view of Kerckhove (US 5870432).

Regarding claim 10, Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar disclose the limitations of claim 1 as applied above. They do not disclose equalizing said communication signal at said receiver following said second time-frequency domain transformation using a frequency domain equalizer to compensate for multipath. However, Kerckhove discloses equalizing said communication signal at said receiver following said second time-frequency domain transformation using a frequency domain equalizer (fig. 1, refs. 20 and 22). Kerckhove discloses that the frequency domain equalizer restores the amplitudes and phases of the received signals (col. 7, lines 3-8) and inherently reduces the effects of multipath interference. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a frequency domain equalizer in the receiver as taught by Kerckhove in the

communications system of Sugita in view of Cafarella, in further view of Scott, and in further view of Koppelaar because it restores the amplitudes and phases of the received signals to reduce the effects of multipath interference.

16. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar.

Regarding claim 16, Sugita discloses a spread-spectrum-based communication system which efficiently utilizes spectrum in the presence of multipath, said communication system (abstract) comprising: a demultiplexer for dividing a stream of data-conveying symbols into a plurality of unspread substreams (fig. 6, ref. 4); a spreading section coupled to said demultiplexer and configured to generate spread substreams from said plurality of unspread substreams (col. 5, lines 9-25); a combining section coupled to said spreading section and configured to form a composite signal in response to said spread substreams (fig. 6, ref. 22 and 23); a transmission section coupled to said combining section and configured to wirelessly transmit a communication signal formed from said composite signal (fig. 6, refs. 7 and 8); a receiving section configured to receive said communication signal (fig. 7); a dispreading section coupled to said receiving section, said dispreading section being configured to generate a baseband signal in response to said communication signal (col. 6, lines 19-36); a first time-frequency domain transformation section coupled after said spreading section (fig. 6, ref. 25); and a second time-frequency domain transformation section coupled between said receiver and said despreading section (fig. 7, ref. 32). Sugita does not disclose (a) that the spreading section is configured

so that said spread substreams correspond to respective ones of said unspread substreams modulated by cyclic variations of a common spreading code, (b) the despreading section comprising a frequency domain equalizer to compensate for multipath, or (c) a first time-frequency domain transformation section coupled between said demultiplexer and said spreading section.

Regarding limitation (a) of claim 1, Cafarella does teach the benefits of using one temporally offset spread spectrum code to spread different data signals (col. 10, lines 3-5). Cafarella further teaches that the orthogonal codes created by the time shifted versions of a single spreading code have no projection on any other waveform in the set (col. 10, lines 44-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to use time shifted versions of a single spreading code as taught by Cafarella among the plurality of data signals disclosed by Sugita because the cyclic time shifted versions of the spreading code provide nearly orthogonal cross correlation properties that are advantageous for multiple user communication systems.

Regarding limitation (b) of claim 1, Kerckhove discloses equalizing said communication signal at said receiver using a frequency domain equalizer (fig. 1, refs. 20 and 22). Kerckhove discloses that the frequency domain equalizer restores the amplitudes and phases of the received signals (col. 7, lines 3-8) and inherently reduces the effects of multipath interference. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a frequency domain equalizer as part of the despreading in the receiver as taught by Kerckhove in the communications system of Sugita because it restores the

amplitudes and phases of the received signals to reduce the effects of multipath interference.

Regarding limitation (c) of claim 1, Koppelaar discloses an analogous communications system which divides a stream of data-conveying symbols into a plurality of unspread substreams at a transmitter, modulates each of said unspread substreams, and transmits (fig. 4). Koppelaar thereby teaches performing a first time-frequency domain transformation (fig. 4, ref. "IFFT") on substreams at a transmitter *prior* to spreading or modulating activity (col. 4, lines 53-68). Hence, it is known in the art to implement a time-frequency domain transformation as shown by Koppelaar before spreading or modulating activity or after spreading activity as shown by Sugita, and the location of the transformation is considered a matter of design choice. It would have been obvious to one having ordinary skill in the art at the time which the invention was made to implement the time-domain transformation before spreading as exemplified by Koppelaar in the system of Sugita because it is a well known alternative in the art.

Regarding claim 20, Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar disclose the limitations of claim 20 as applied above. Further, it is inherent that spreading code exhibits a flat response. The term spreading code refers to code that exhibits a flat spectral response and is used to spread the spectral response of data having a frequency spectrum peak. The spreading section refers to common code that is a spreading code. Hence, the spreading section is configured so that the spectral analysis of the common code exhibits a flat response.

17. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Kerckhove, in further view of Koppelaar, and in further view of Scott.

Regarding claim 17, Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar disclose the limitations of claim 16 as applied above. They do not disclose that said dispreading section comprises a mismatched filter. However, Scott teaches the advantages of the use of a mismatched filter (col. 47, lines 62-65). Because the mismatched filter reduces sidelobes in the filter response, it is more robust against incorrect symbol decisions. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the mismatched filter with the benefits of sidelobe suppression as taught by Scott in the communication system of Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar because sidelobe suppression is a benefit of the mismatched filter leading to correct symbol decisions.

Regarding claim 19, Sugita in view of Cafarella, in further view of Kerckhove, in further view of Koppelaar, and in further view of Scott disclose the limitations of claim of 17 as applied above. Further, Sugita discloses said dividing activity produces successive blocks of symbols, where each block includes symbols currently present in each unspread substream, and each block has a block period. Each group of symbol outputs from the serial to parallel converter (fig. 6, ref. 4) comprises a block including symbols present in each unspread substream. Further, Koppelaar discloses temporally offsetting and combining activities are being

mutually configured so that for a portion of each block period said composite signal is responsive to symbols from two different blocks (col. 1, lines 5-18, lines 50-64). Koppelaar teaches that intersymbol interference is introduced by delays among the blocks of data to be combined (fig. 4, ref. "DELAY") to thereby make the transmission signal less vulnerable to impediments of the transmission channel (col. 1, lines 60-64). Also, it is obvious according to the disclosure of Scott that a mismatched filter is equivalent to that of a matched filter combined with a sidelobe suppression filter. Therefore, it is obvious that the mismatched filter corresponds to a matched filter with a sidelobe suppression filter.

18. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Kerckhove, in further view of Koppelaar, and in further view of Schilling.

Regarding claim 21, Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar disclose the limitations of claim 16 as applied above. They do not disclose a time division multiple access (TDMA) modulation section coupled to said demultiplexer, said TDMA modulation section being configured so that said communication signal is a TDMA signal for which recipients are distinguished from one another by being assigned to different time slots. However, Schilling teaches a time division multiple access (TDMA) modulation section coupled to said demultiplexer (fig. 2, ref. 42), said TDMA modulation section being configured so that said communication signal is a TDMA signal for which recipients are distinguished from one another by being assigned to different time slots (inherent). Each receiver evaluates a particular time slot as disclosed by

Schilling because the signals between the receivers and transmitters are orthogonal in time (col. 3, 37-42) meaning that a single receiver will evaluate and transmit on a single time slot. Schilling thereby discloses a TDMA system which is well known in the art, and discloses that the advantages are reduction in multipath and the near-far problem (col. 2, lines 30-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a TDMA system as taught by Schilling in the communications system of Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar.

Regarding claim 22, Sugita in view of Cafarella, in further view of Kerckhove, in further view of Koppelaar, and in further view of Schilling disclose the limitations of claim 21 as applied above. Further, Schilling discloses a method of operating a spread-spectrum-based communication system wherein the transmitter is a first transmitter (fig. 1, ref. 30) and the communication signal is a first communication signal the first transmitter being configured so that the first communication signal occupies a spectrum and the first communication signal is detectable throughout a first radio coverage area, and additionally comprises transmitting a second communication signal from a second transmitter (col. 3, lines 24-28), the second communication signal occupying spectrum and being detectable throughout a second radio coverage area which is adjacent to the first radio coverage area and both the first and second signals being transmitted using a common spectrum. It is understood that a transmitter transmits a first communication signal that is detectable throughout a first coverage area, and a second transmitter transmits a second communication signal that is detectable throughout a second coverage area.

It is also inherent in a TDMA system that the first and second signals are both communicated on the same spectrum because the purpose of a TDMA system is to divide one common spectrum of many signals in time.

19. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita in view of Cafarella, in further view of Kerckhove, in further view of Koppelaar, and in further view of Baier et al ("Performance of M-algorithm MLSE equalizers in frequency-selective fading mobile radio channels"; hereafter "Baier et al").

Regarding claim 24, Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar disclose the limitations of claim 16 as applied above. They do not disclose the use of a MLSE equalizer in the receiver. However, Baier teaches the advantages of MLSE equalizers in receivers for mitigating frequency selective fading (abstract). One skilled in the art is well aware of the advantages gained by the use of MLSE equalizers in receivers. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize an MLSE equalizer as taught by Baier in the communications system of Sugita in view of Cafarella, in further view of Kerckhove, and in further view of Koppelaar because it can be advantageously used to improve performance in frequency selective fading channels.

Allowable Subject Matter

20. Claims 6, 7, 12, 18 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (703) 305-0374. The examiner can normally be reached on M-F 8-5 EST. *It is requested that the Applicant contact the Examiner before a response to this office action is made to expedite prosecution of the case.*

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
July 25, 2004

jmp

CHIEH M. FAN
PRIMARY EXAMINER